AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

B1

1. (Canceled) A luminescent micro- or nanoparticle, characterized in that it contains luminescent substances having long luminescence decay times and said luminescent substances are essentially shielded from ambient chemical, biochemical and gaseous parameters.

2. (Canceled) The particle as claimed in claim 1, characterized in that one or more luminescence properties of said luminescent substances, which are in particular selected from the group consisting of quantum yield, spectral characteristics, luminescence decay time and anisotropy, are essentially independent of the particular environment.

3. (Canceled) The particle as claimed in claim 1, characterized in that the luminescent substances are metal/ligand complexes of ruthenium(II), osmium(III) rhenium(I), iridium(III) platinum(II) and palladium(II) as central atom.

4. (Canceled) The particle as claimed in claim 3, characterized in that the luminescent substances are complexes with 2- or 3-dentate polypyridyl ligands such as 2,2'-bipyridine, bipyrazine, phenanthroline, terpyridyl or derivatives thereof as ligands.

5. (Canceled) The particle as claimed in claim 3, characterized in that the luminescent compounds are the tris complexes of ruthenium(II) with 2,2'-bipyridyl, 1,10-phenanthroline, 4,4-diphenyl-2,2'-bipyridyl and 4,7- diphenyl-1,10-phenanthroline as ligands.

6. (Canceled) The particle as claimed in claim 1, characterized in that the luminescent substances are carbonyl complexes of Re(I) with additional diimine ligands such as derivatives of 2,2'-bipyridyl and 1,10-phenanthroline.

7. (Canceled) The particle as claimed in claim 1, characterized in that the luminescent compounds are porphyrin complexes of Pt(II) and Pd(II) as central atoms.

8. (Canceled) The particle as claimed in claim 1, characterized in that it contains an organic polymer which distinguishes itself by low absorption of water or/and minimum gas permeability.

9. (Canceled) The particle as claimed in claim 8, characterized in that it contains an organic polymer from the group consisting of polyacrylonitrile, poly(meth)acrylic copolymers, polyvinyl chlorides or polyvinylidene chlorides and copolymers thereof.

B1

10. (Canceled) The particle as claimed in claim 9, characterized in that it contains polyacrylonitrile or polyacrylonitrile copolymers, in particular copolymers with acrylic acid, acrylic amines or/and acrylic esters.

11. (Canceled) The particle as claimed in claim 1, characterized in that it contains a glass which is essentially free of micropores.

12. (Canceled) The particle as claimed in claim 11, characterized in that it contains a glass which has been produced according to a sol/gel process.

13. (Canceled) The particle as claimed in claim 11, characterized in that it contains a sol/gel glass which has been prepared from silicon, titanium, zirconium or/and tin tetraalcoholates.

14. (Canceled) The particle as claimed in claim 1, characterized in that its surface has been modified by reactive groups such as amino, epoxy, hydroxyl, thiol or/and carboxyl groups which make possible the covalent coupling of luminescent indicators or/and biomolecules.

15. (Canceled) The particle as claimed in claim 14, characterized in that it contains luminescent indicators or/and biomolecules covalently coupled to its surface.

16. (Canceled) A method for preparing luminescent micro- and nanoparticles as claimed in claim 8, wherein the particles are precipitated from a polymer solution in which the luminescent compound is present in soluble form by adding a liquid dropwise, with the liquid being miscible with the polymer solvent but causing a reduction in the solubility of the polymer.

17. (Canceled) The method as claimed in claim 15, wherein the particles are precipitated from a solution comprising dimethylformamide and polyacrylonitrile or polyacrylonitrile copolymer, in which the luminescent compound is present in soluble form, by adding water or an aqueous solution dropwise.

B1

18. (Canceled) The method as claimed in claim 16, wherein the particle diameter is adjusted by varying the polymer content of the solution.

19. (Canceled) A method for preparing luminescent micro- and nanoparticles as claimed in claim 8, wherein the luminescent compound is incorporated by diffusion from a solvent (mixture) into already prefabricated particles.

20. (Canceled) A method for preparing luminescent micro- and nanoparticles as claimed in claim 8, wherein the particles are formed by spraying a polymer solution in which the luminescent compound is present in soluble form and evaporation of the solvent.

21. (Canceled) The method as claimed in claim 20, wherein the particle diameter is adjusted by varying the polymer content of the spray solution.

22. (Canceled) A method for preparing luminescent microparticles as claimed in claim 11, wherein the luminescent compound is incorporated into compressed monolithic sol/gel glasses which are subsequently ground and fractionated according to size.

23. (Canceled) The use of the luminescent micro- and nanoparticles as claimed in claim 1 for labeling and luminometric detection of biomolecules from the group consisting of toxins, hormones, hormone receptors, peptides, proteins, lectins, oligonucleotides, nucleic acids, antibodies, antigens, viruses and bacteria.

24. (Canceled) The use of the luminescent micro- and nanoparticles as claimed in claim 1 as reference standards of fluorescence intensity signals in fluorimetric assays.

25. (Canceled) The use as claimed in claim 23, wherein addition of the standard to the sample converts the intensity information into a phase signal or/and a time-dependent parameter.

B1

26. (Canceled) The use of the luminescent micro- and nanoparticles as claimed in claim 1 for referencing the luminescence intensity signal of optical luminescence sensors, wherein the particles are immobilized to a solid phase together with a luminescent indicator.

27. (Canceled) A method for luminometric determination of a biochemical or chemical parameter using two different luminescent dyes which have different decay times and the time or phase characteristics of the resulting luminescent response are used for generating a reference parameter for determination of said parameter, with the first luminescent dye corresponding to said parameter at least with respect to luminescence intensity and the second one not corresponding to said parameter at least with respect to luminescence intensity and luminescence decay time, characterized in that the second luminescent dye is used in the form of particles as claimed in claim 1.

B2

28. (New) A luminescent micro- or nanoparticle, wherein said micro- or nanoparticle comprises polyacrylonitrile or polyacrylonitrile copolymers and luminescent substances having long luminescence decay times wherein said luminescent substances are essentially shielded from ambient chemical, biochemical and gaseous parameters.

29. (New) The luminescent micro- or nanoparticle as claimed in claim 28, wherein said copolymers are selected from the group consisting of acrylic acid, acrylic amines and acrylic esters.

30. (New) The luminescent micro- or nanoparticle as claimed in claim 28, wherein one or more luminescence properties of said luminescent substances are essentially independent of the particular environment.

31. (New) The luminescent micro- or nanoparticle as claimed in claim 30, wherein said luminescence properties are selected from the group consisting of quantum yield, spectral characteristics, luminescence decay time and anisotropy.

32. (New) The luminescent micro- or nanoparticle as claimed in claim 28, wherein said luminescent substances are metal/ligand complexes of ruthenium(II), osmium(II), rhenium(I), iridium(III), platinum(II) and palladium(II) as central atom.

B2

33. (New) The luminescent micro- or nanoparticle as claimed in claim 32, wherein the luminescent substances are complexes with 2- or 3-dentate polypyridyl ligands.

34. (New) The luminescent micro- or nanoparticle as claimed in claim 33, wherein said 2- or 3-dentate polypyridyl ligands are selected from the group consisting of 2,2'-bipyridine, bipyrazine, phenanthroline, terpyridyl and derivatives thereof.

35. (New) The luminescent micro- or nanoparticle as claimed in claim 33, wherein the luminescent compounds are the tris complexes of ruthenium(II) with 2,2'-bipyridyl, 1,10-phenanthroline, 4,4-diphenyl-2,2'-bipyridyl and 4,7-diphenyl-1,10-phenanthroline as ligands.

36. (New) The luminescent micro- or nanoparticle as claimed in claim 28, wherein the luminescent substances are carbonyl complexes of Re(I) with additional diimine ligands.

37. (New) The luminescent micro- or nanoparticle as claimed in claim 36, wherein said diimine ligands are selected from the group consisting of derivatives of 2,2'-bipyridyl and 1,10-phenanthroline.

38. (New) The luminescent micro- or nanoparticle as claimed in claim 28, wherein the luminescent compounds are porphyrin complexes of Pt(II) and Pd(II) as central atoms.

39. (New) The luminescent micro- or nanoparticle as claimed in claim 28, wherein said micro- or nanoparticle contains an organic polymer which distinguishes itself by low absorption of water and/or minimum gas permeability.

40. (New) The luminescent micro- or nanoparticle as claimed in claim 28, wherein said micro- or nanoparticle contains a glass which is essentially free of micropores.

41. (New) The luminescent micro- or nanoparticle as claimed in claim 40, wherein said micro- or nanoparticle contains a glass which has been produced according to a sol/gel process.

B2

42. (New) The luminescent micro- or nanoparticle as claimed in claim 40, wherein said micro- or nanoparticle contains a sol/gel glass which has been prepared from silicon, titanium, zirconium and/or tin tetraalcoholates.

43. (New) The luminescent micro- or nanoparticle as claimed in claim 28, wherein its surface has been modified by reactive groups which make possible the covalent coupling of luminescent indicators and/or biomolecules.

44. (New) The luminescent micro- or nanoparticle as claimed in claim 43, wherein said reactive groups are selected from the group consisting of amino, epoxy, hydroxyl, thiol and carboxyl groups.

45. (New) The luminescent micro- or nanoparticle as claimed in claim 43, wherein said micro- or nanoparticle contains luminescent indicators and/or biomolecules covalently coupled to its surface.

46. (New) A method for preparing luminescent micro- and nanoparticles, wherein said micro- or nanoparticles comprise an organic polymer which distinguishes itself by low absorption of water and/or minimum gas permeability, comprising, precipitating luminescent micro- and nanoparticles from a polymer solution in which the luminescent compound is present in soluble form by adding a liquid dropwise, with the liquid being miscible with the polymer solvent but causing a reduction in the solubility of the polymer.

47. (New) The method as claimed in claim 46, wherein said micro- or nanoparticles are precipitated from a solution comprising dimethylformamide and polyacrylonitrile or polyacrylonitrile copolymer, in which the luminescent compound is present in soluble form, by adding water or an aqueous solution dropwise.

48. (New) The method as claimed in claim 46, wherein the micro- or nanoparticle diameter is adjusted by varying the polymer content of the solution.

49. (New) A method for preparing luminescent micro- and nanoparticles as claimed in claim 39, wherein the luminescent compound is incorporated by diffusion from a solvent (mixture) into already prefabricated particles.

B2

50. (New) A method for preparing luminescent micro- and nanoparticles, wherein said micro- or nanoparticles comprise an organic polymer which distinguishes itself by low absorption of water and/or minimum gas permeability, comprising, forming the micro- or nanoparticles by spraying a polymer solution in which the luminescent compound is present in soluble form and evaporating the solvent.

51. (New) The method as claimed in claim 50, wherein the particle diameter is adjusted by varying the polymer content of the spray solution.

52. (New) A method for preparing luminescent microparticles as claimed in claim 40, wherein the luminescent compound is incorporated into compressed monolithic sol/gel glasses which are subsequently ground and fractionated according to size.

53. (New) A method of using luminescent micro- or nanoparticles to detect biomolecules comprising the steps of

(i) coupling the luminescent micro- or nanoparticles as claimed in claim 43 with biomolecules; and

(ii) luminometrically detecting the coupled micro- or nanoparticles and biomolecules;

wherein said biomolecules are selected from the group consisting of toxins, hormones, hormone receptors, peptides, proteins, lectins, oligonucleotides, nucleic acids, antibodies, antigens, viruses and bacteria.

B2

54. (New) The method of claim 53 wherein the luminescent micro- and nanoparticles serve as reference standards of fluorescence intensity signals in fluorimetric assays.

55. (New) The method of claim 53, wherein addition of the reference standard to the sample converts the intensity information into a phase signal or/and a time-dependent parameter.

56. (New) A method of using luminescent micro- or nanoparticles to reference the luminescence intensity signal of optical luminescence sensors comprising the steps of

(i) immobilizing the luminescent micro- or nanoparticles of claim 28 to a solid phase together with a luminescent indicator; and

(ii) detecting the luminsescent signal.

57. (New) A method for luminometric determination of a biochemical or chemical parameter comprising using two different luminescent dyes which have different decay times and wherein the time or phase characteristics of the resulting luminescent response are used for generating a reference parameter for determination of said parameter, with the first luminescent dye corresponding to said parameter at least with respect to luminescence intensity and the second one not corresponding to said parameter at least with respect to